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EXAMINER

SALTARELLI, DOMINIC D

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| ART UNIT | PAPER NUMBER |
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2611

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/748,717

Applicant(s)

PANGRAC ET AL

Examiner

Dominic D. Saltarelli

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 14-22, 24-41 and 44-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 14-22, 24-41 and 44-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 8, 2005 has been entered.

Response to Arguments

2. Applicant's arguments filed August 8, 2005 have been fully considered but they are not persuasive.

3. Regarding independent claim 59, applicant argues that "Williams does not suggest there is a connection between carrier wavelengths set in each of the integrated circuits 401 and bandwidth allocated by MAC 105" (applicant's remarks, page 20, lines 2-4). However, as shown in col. 12, lines 31-44, Williams teaches precisely that, namely, the bandwidth allocated to a subscriber is in the form of a discrete wavelength, as this is a cheaper and safer alternative to other types of multiplexing in an optical environment.

4. Regarding independent claim 1, applicant argues that "Darcie in no way allocates a first portion of the remaining portion of television broadcast spectrum to a downstream subscriber channel and allocates a second portion of the television broadcast spectrum to an upstream subscriber channel" (applicant's remarks, page 22, last paragraph).

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5. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As shown below regarding claim 1, the claimed limitations of "allocating a first portion of the [remaining portion] of the television broadcast spectrum to downstream subscriber channels and a second portion of the remaining portion of the television broadcast spectrum is allocated to upstream subscriber channels" (claim 1, lines 24-27) are taught by McNamara.

6. Also regarding independent claim 1, applicant argues that "Darcie teaches away from the present invention in that each transmitter and receiver actually shares the same bandwidth within its own channel" (applicant's remarks, page 22, last paragraph), by stating "in no way is it suggested by Darcie that such upstream and downstream channels are unshared because they utilize the same frequency channel for both transmission and receiving" (applicant's remarks, page 23, lines 2-4).

7. In response to applicant's argument that Darcie teaches away from the present invention, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner notes that the only teaching upon which Darcie

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was relied upon was the use of unique, distinct, unshared channels for communication (Darcie, col. 3, lines 16-31), wherein this teaching, singly applied to either the upstream or downstream portions by Darcie, alone provides sufficient motivation to modify the system disclosed by McNamara as described below regarding claim 1, and thus in no way actively teaches away from the system disclosed by McNamara.

8. Lastly regarding independent claim 1, applicant argues that “McNamara cannot show or suggest system wherein each subscriber channel comprises a respective downstream subscriber channel and a respective upstream subscriber channel, each having a dedicated and unshared bandwidth” (applicant’s remarks, page 24, second paragraph), by stating “The operation of McNamara’s system requires tuning each subscriber unit to the same frequency, thereby permitting shared allocated spectrum space” (applicant’s remarks, lines 6-8), describing the embodiment wherein two subscriber nodes communicate with each other over the disclosed system.

9. In response, examiner notes that while this particular embodiment is supported by the McNamara reference, it also equally supports communication between a subscriber node (fig. 3, subscriber node 48) and a server node (fig. 3, server node 46), such that the bandwidth being used is a dedicated, unshared channel used by a single subscriber node because it is communicating with a server, not another subscriber (col. 6, lines 7-24).

10. Regarding independent claim 22, applicant argues that Gerszberg does not show or suggest “the point of distribution embed an address in the source information identifying a subscriber device from among a plurality of subscriber devices at the

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subscriber destination" (applicant's remarks, page 25, second paragraph), stating that "There is nothing within the teaching of Gerszberg that suggests the Ethernet frames originate with head end 63 and contain a specific destination address for a particular customer premise device 10" (applicant's remarks, page 25, first paragraph).

11. In response, examiner notes that prior to attaching an Ethernet address to data packets for forwarding over the local network disclosed by Gerszberg, the intelligent services director (fig. 1a, ISD 22) must know to which device said packet data must be forwarded. This would require address information embedded in the source information identifying the specific subscriber device. For example, when the system disclosed by Gerszberg is implemented such that PCs access Internet data utilizing TCP/IP through the ISD (col. 9, lines 28-50), then outgoing data packets (requests) from each PC would include a destination IP address of the packet and the source IP address assigned to each PC. Data packets being returned in response to the requests would then include source IP information identifying the source of the information and the destination IP address to which the packet is addressed, namely the PC that made said particular request.

12. Applicant's arguments with respect to claim 63 have been considered but are moot in view of the new grounds of rejection.

Claim Objections

13. Claim 34 is objected to because of the following informalities: On lines 4 and 10, "switch" should be changed to --switch matrix--.

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14. Claim 35 is objected to because of the following informalities: On line 2, "switch" should be changed to --switch matrix--.
15. Claim 38 is objected to because of the following informalities: On line 3, "switch" should be changed to --switch matrix--.
16. Claim 41 is objected to because of the following informalities: On line 1, "switch" should be changed to --switch matrix--.
17. Claim 53 is objected to because of the following informalities: On line 1, "switch" should be changed to --switch matrix--.
18. Claim 58 is objected to because of the following informalities: On line 1, "switch" should be changed to --switch matrix--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

20. Claims 59-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Williams et al. (5,808,767, of record) [Williams].

Regarding claim 59, Williams discloses a communication system for distributing information via an optical network (fig. 6), comprising;

An optical plant (fig. 6, optical fibers 104 and 612_{1..N}) ;

A point of distribution (CO in fig. 1), comprising:

A multi-port switch (input interface to MAC 105 in fig. 1 that includes the discrete switches 106-110, col. 6 line 49 – col. 7 line 3 and col. 9, lines 40-47) that forwards source information for each of a plurality of subscriber destinations to a corresponding port (col. 6 line 66 – col. 7 lines 3);

A plurality of optical transceivers (fig. 4, transmitter array 401 and receiver 403), each optical transceiver coupled to one of the plurality of ports of the switch to convert information received from a respective port to a respective one of a plurality of optical source signals (each discrete wavelength carries an optical source signal, col. 10, lines 25-33), and each optical transceiver exclusively assigned to a subscriber destination to allocated unshared bandwidth to its assigned subscriber destination (each transceiver operates on a distinct wavelength, col. 10, lines 18-33, wherein the wavelengths are dynamically assigned to subscriber destinations, col. 8, lines 24-31, exclusively, col. 12, lines 31-44); and

A wavelength division multiplexing (WDM) combiner (optical combiner/coupler for multi-IC arrays, col. 10, lines 34-43 and col. 12, lines 7-15) that combines an optical source signal from each of the plurality of optical transceivers into a combined optical signal and that transmits the combined signal onto the optical plant (col. 9 line 65 – col. 10 line 8 and col. 10 lines 34-43);

A plurality of fiber optic cables, each routed to a corresponding one of a plurality of subscriber destinations (fig. 5, col. 12, lines 45-60); and

A WDM selector (fig. 5, WDS 501, 502), coupled to the optical plant, that receives and separates the combined optical signal from the WDM combiner into its individual optical signal components, and that forwards each separate optical signal over a corresponding one of the plurality of fiber optic cables to the subscriber destinations (col. 12, lines 50-60).

Regarding claim 60, Williams discloses the system of claim 59, and discloses the switch comprises an optical switch (MAC 105 performs switching on all optical signals, as seen in fig. 5, the MAC 105 receives optical signals from SONET ADD/DROP location 601 and routes said optical signals to optical coupler 611, col. 14, lines 23-28).

Regarding claim 61, Williams discloses the system of claim 59, and discloses a plurality of gateway devices (fig. 1, IID 101, col. 6, lines 30-34 and col. 7 lines 18-23), each located at a respective subscriber destination and coupled to a respective one of the plurality of fiber optic cables (fig. 1, fiber 104).

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. Claims 1-3, 5, 6, 8-10, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara et al. (4,533,948, of record) [McNamara] in view of Binns et al. (5,329,308, of record) [Binns], Darcie (4,701,904, of record), and Hoarty et al. (5,526,034, of record) [Hoarty].

Regarding claim 1, McNamara discloses a method of distributing information (col. 3 line 64 – col. 4 line 21) by a point of distribution (fig. 3, headend 10) to subscribers (fig. 3, subscriber nodes) via a communication network (fig. 3, network 28), comprising:

Dividing a television broadcast spectrum into a plurality of subscriber channels (col. 5, lines 21-26), each subscriber channels having a deterministic bandwidth (each channel is set to be capable of a 128 Kb/s transmission rate);

Allocating bandwidth to each of a plurality of subscriber destinations (col. 5, lines 32-39);

Assigning each of the subscriber destinations to a subscriber channel (col. 5, lines 32-39);

Forwarding source information to each subscriber destination based on assigned subscriber channels (source nodes send information to user nodes through the headend, col. 4 line 60 – col. 5 line 20, using the assigned channels, col. 7 line 62 – col. 8 line 24);

Modulating forwarded source information for each subscriber channel (FSK modulator 16 in headend 10, col. 4, lines 30-54);

Combining modulated forwarded source information from each subscriber channel into a combined signal (there are at least 80 disclosed FSK data channels in the forward and return spectrum space handled by the headend, col. 5, lines 21-31, thus it is a combined signal of at least 80 channels which is broadcast from the headend); and

Distributing the combined signal to the plurality of subscriber destinations via the communication network (col. 4, lines 9-21),

Allocating a first portion of the television broadcast spectrum to downstream subscriber channels (fig. 1, frequency band 4, col. 3, lines 57-63) and a second portion of the remaining portion of the television broadcast spectrum is allocated to upstream subscriber channels (fig. 1, frequency band 2, col. 3, lines 57-63), and

Each subscriber channel comprises a respective downstream subscriber channel and a respective upstream subscriber channel, each having dedicated and unshared bandwidth ("home channel", col. 5, lines 21-39).

McNamara fails to disclose up converting modulated forwarded source information into a corresponding one of the subscriber channels and the bandwidth allocated to each of a plurality of subscriber destinations is unshared, in the sense that only a given subscriber destination from among the plurality of subscriber destinations forwards or receives information utilizing it's allocated

unshared bandwidth and allocating broadcast television channels within a predetermined frequency range of the television broadcast spectrum, dividing the plurality of subscriber channels into a remaining portion of the television broadcast spectrum outside the predetermined frequency range allocated to the broadcast television channels, and combining the broadcast television channels into the combined signal.

In an analogous art, Binns teaches up converting modulated source information into corresponding subscriber channels (fig. 4, outputs of baseband to IF modulators 332 and 333 provide modulated source information which is then applied to IF to Downstream channel modulators 328 and 329 which up convert the modulated source information into corresponding subscriber channels, col. 17, lines 15-28), for transmitting analog source information over a cable network (fig. 3, cable distribution network).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara to include up converting modulated source information into a corresponding one of the subscriber channels, as taught by Binns, for the benefit of increased network flexibility by handling analog signals as well as digital.

McNamara and Binns fail to disclosed the bandwidth allocated to each of a plurality of subscriber destinations is unshared, in the sense that only a given subscriber destination from among the plurality of subscriber destinations forwards or receives information utilizing it's allocated unshared bandwidth and

allocating broadcast television channels within a predetermined frequency range of the television broadcast spectrum, dividing the plurality of subscriber channels into a remaining portion of the television broadcast spectrum outside the predetermined frequency range allocated to the broadcast television channels, and combining the broadcast television channels into the combined signal.

In an analogous art, Darcie teaches an optical communication system (fig. 1, col. 3, lines 5-15) wherein system bandwidth is allocated to a plurality of subscribers via a plurality of channels comprising unshared bandwidth, wherein each subscriber is allocated a particular channel (col. 3, lines 16-42), providing maximum use of the available frequency spectrum while entirely avoiding contention problems for multiple users (col. 1 line 65 – col. 2 line 31).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara and Binns to include allocating unshared bandwidth to each of a plurality of subscriber destinations, wherein only a given subscriber destination from among the plurality of subscriber destinations receives information utilizing its allocated unshared bandwidth, as taught by Darcie, for the benefit of eliminating any contention problems that would otherwise arise from the use of the system by multiple users.

McNamara, Binns, and Darcie fail to disclose allocating broadcast television channels within a predetermined frequency range of the television broadcast spectrum, dividing the plurality of subscriber channels into a remaining portion of the television broadcast spectrum outside the predetermined frequency

range allocated to the broadcast television channels, and combining the broadcast television channels into the combined signal.

In an analogous art, Hoarty teaches allocating broadcast television channels within a predetermined frequency range of the television broadcast spectrum (col. 6, lines 25-35 and fig. 31, broadcast spectrum portion 315), dividing a plurality of subscriber channels [interactive/virtual channels] into a remaining portion of the television broadcast spectrum (fig. 31, broadcast spectrum portion 317) outside the predetermined frequency range allocated to the broadcast television channels (col. 17 line 66 – col. 18 line 4 and col. 18, lines 23-35), and combining the broadcast television channels into a combined signal (fig. 9, col. 9, lines 13-36), for the benefit of providing both interactive services and traditional broadcast programming such that they do not interfere with each other upon broadcast and reception (use of guardbands 318 ensure this, col. 18, lines 31-33).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, and Darcie to include allocating broadcast television channels within a predetermined frequency range of the television broadcast spectrum, dividing the plurality of subscriber channels into a remaining portion of the television broadcast spectrum outside the predetermined frequency range allocated to the broadcast television channels, and combining the broadcast television channels into the combined signal, as taught by Hoarty, for the benefit of providing both interactive information services

and traditional broadcast television programming such that they do not interfere with each other upon broadcast from the point of distribution and reception at the subscriber destinations.

Regarding claim 2, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, and further disclose dividing the television broadcast spectrum into an upstream portion and a downstream portion (McNamara, col. 3, lines 48-56, col. 4 lines 9-21, and col. 5, lines 21-26) and allocating each subscriber destination an unshared downstream bandwidth and an unshared upstream bandwidth (McNamara, col. 5, lines 21-39).

Regarding claim 3, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 2, and further disclose each subscriber channel includes a downstream subscriber channel in the downstream portion and an upstream subscriber channel in the upstream portion (McNamara, col. 5, lines 21-39).

Regarding claim 5, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, and further disclose receiving source information from a plurality of content servers (McNamara, fig. 3, server nodes 46, col. 5 lines 63-67) in the form of data packets (McNamara, fig. 9, frame message 120, col. 9, lines 62-65) and the forwarding comprising forwarding the received source

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information based on address information within the data packets (McNamara, col. 10, lines 25-31).

Regarding claim 6, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, and further disclose tracking actual bandwidth usage of each subscriber destination (by NTM 32 for billing and load leveling statistics, McNamara, col. 6 line 66 – col. 7 line 8).

Regarding claim 8, Hoarty additionally teaches allocating a substantial portion of the television broadcast spectrum for use in interactive television information signals (fig. 31, spectrum portion 317, col. 18, lines 23-33 and the band for interactive channels in fig. 10), providing services to a large number of different subscribers (col. 8, lines 40-58).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to include dividing a substantial portion of the television broadcast spectrum into the plurality of subscriber channels, as taught by Hoarty, for the benefit of providing the information services to a large number of different subscriber locations.

Regarding claim 9, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, and further disclose receiving information in packetized format (McNamara teaches head end 10 receives all frame messages, col. 5, lines 1-12,

which are in packet format, col. 9 line 62 – col. 10 line 8) and forwards the packetized information (McNamara, col. 5, lines 6-12) to a subscriber channel (McNamara, col. 5, lines 21-26, 32-39) assigned to the subscriber destination (forwarding is based address of destination which is coupled to channel frequency, McNamara, col. 7, lines 26-33 and col. 7 line 62 – col. 8 line 6), but fail to disclose receiving a request for video information from a subscriber destination.

Hoarty additionally teaches transmitting video information to subscribers on a demand basis (col. 18, lines 36-48 and col. 8, lines 40-49), providing a wide array of video services to interested subscribers (col. 19, lines 20-47).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to include receiving a request for video information from a subscriber destination, as taught by Hoarty, for the benefit of providing a wide array of video services of which are individually selectable by interested subscribers from subscriber destinations.

Regarding claim 10, Hoarty additionally teaches the video information is a broadcast television channel (col. 8, lines 25-30), conserving bandwidth or widening the selections available to subscribers (col. 8, lines 30-33).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to

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include the video information is a broadcast television channel, as additionally taught by Hoarty, for the benefit of conserving bandwidth in the communication network or increasing the amount of material available for selection by subscribers.

Regarding claim 19, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, and further disclose receiving a physical address request from a subscriber destination (received by NRM 36, McNamara, col. 6, lines 56-65), retrieving the requested physical address from a stored address database (McNamara, col. 7 line 62 – col. 8 line 6) and forwarding the retrieved physical address to the requesting subscriber destination (McNamara, col. 7 line 62 – col. 8 line 6).

23. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, and Hoarty as applied to claim 1 above, and in further view of Hooper et al. (5,442,390, of record) [Hooper].

Regarding claim 4, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, but fail to disclose subdividing at least one subscriber channel into a plurality of bandwidth increments and assigning multiple subscriber destinations to the subscriber channel, each of the multiple subscriber destinations being allocated bandwidth increments of the subscriber channel.

In an analogous art, Hooper teaches establishing fixed point-to-point bandwidths (col. 5, lines 20-23) by subdividing a channel into bandwidth increments (use of frequency division multiplexing to partition a channel into sub-channels, col. 5, lines 20-31), increasing the number of subscribers to which services are provided.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, and Darcie to include subdividing a subscriber channel into a plurality of bandwidth increments and assigning multiple subscriber destinations to the subscriber channel, each of the multiple subscriber destinations being allocated bandwidth increments of the subscriber channel, as taught by Hooper, for the benefit of increasing the number of subscriber destinations to which services can be provided over the given bandwidth portion.

24. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, and Hoarty as applied to claim 6 above, and in further view of Bigham et al. (5,544,161, of record) [Bigham].

Regarding claim 7, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 6, but fail to disclose monitoring source information by service type provided to a subscriber destination and tracking bandwidth usage of the subscriber destination for each service type.

In an analogous art, Bigham teaches monitoring source information by service type provided to a subscriber destination (the level 1 gateway monitors the connections between subscribers and service providers, col. 15 line 53 – col. 16 line 8 and col. 16, lines 28-34, 40-48) and tracks the bandwidth usage of each subscriber destination for each service type (the gateway monitors actual bandwidth usage as the link is active, col. 15, lines 60-63), for the benefit of accurate billing of subscribers for services rendered.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to include monitoring source information by service type provided to a subscriber destination and tracking bandwidth usage of the subscriber destination for each service type, as taught by Bigham, for the benefit of accurate billing of subscribers for information services rendered to subscriber destinations.

25. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, and Hoarty as applied to claim 1 above, and further in view of Paik et al. (5,136,411, of record) [Paik].

Regarding claim 14, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, but fail to disclose converting the combined signal into an optical signal and transmitting the optical signal on an optical plant to an optical transceiver node.

In an analogous art, Paik teaches an HFC network (fig. 1, col. 3, lines 48-56), wherein a combined electrical signal is converted to an optical signal at the head end and transmitted (combined signal from several sources is converted to an optical signal before transmission by the head end, col. 3, lines 57-67) to an optical receiver node (fig. 1, distribution terminal 12) via an optical plant (fig. 1, optical fiber 16), wherein HFC networks are a cost efficient form of long distance signal transmission (col. 1 line 66 – col. 2 line 7).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to include converting the combined signal into an optical signal, and transmitting the optical signal to an optical transceiver node via an optical plant, as taught by Paik, for the benefit of utilizing a more effective and cost efficient form of long distance signal transmission to subscriber destinations.

26. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, and Hoarty as applied to claim 1 above, and further in view of Eng (6,370,153, of record).

Regarding claim 15, McNamara, Binns, Darcie and Hoarty disclose the method of claim 1, and further disclose receiving a combined upstream signal from the communication network (McNamara, col. 4, lines 9-21), splitting the upstream signal into multiple streams of subscriber information (taught by McNamara, an inherent feature of the head end in fig. 2, as having a plurality of

DCAM modules [11a, 11b, etc...] requires some form of signal splitting to couple the upstream input from the common cable 25 [fig. 3] to each DCAM module), demodulating a return RF signal into packetized subscriber information, and forwarding the packetized subscriber information (McNamara, col. 5, lines 1-12), but fails to disclose providing each stream of subscriber information to a corresponding one of a plurality of tuners, each tuner tuned to a corresponding subscriber channel and extracting by each tuner a corresponding RF signal.

In an analogous art, Eng teaches providing separate streams of subscriber information (from diplex filter 252 in fig. 14) to a corresponding one of a plurality of tuners (tuners 258 and 259), each tuner tuned to a corresponding subscriber channel and extracting by each tuner a corresponding RF signal (col. 18, lines 45-65, each upstream channel is sent to a separate tuner, and the use of two is illustrative, as the invention contemplates using a plurality of channels which would in turn require a plurality of tuners to extract data from each, col. 11, lines 11-20), enabling flexible, frequency agile reception of upstream information (each tuner is 'frequency agile', col. 18, lines 45-48 and 59-61).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to include providing each stream of subscriber information to a corresponding one of a plurality of tuners, each tuner tuned to a corresponding subscriber channel and extracting by each tuner a corresponding RF signal, as taught by Eng, for the benefit of flexible, frequency agile reception of subscriber information.

Regarding claim 16, Eng additionally discloses receiving an optical signal and converting the optical signal into a combined upstream signal (performed by optical receiver 38 in fig. 1, col. 11, lines 1-4), wherein utilizing fiber optics for signal transmission is well known to have very high bandwidth and superior propagation properties.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, Hoarty and Eng to include receiving an optical signal and converting the optical signal into a combined upstream signal, as taught by Eng, for the benefit of utilizing fiber optics for signal transmission which are well known to have very high bandwidth, as compared to traditional coaxial cable, and superior propagation properties, such a lower signal loss over distance.

27. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, and Hoarty as applied to claim 1 above, and in further view of Williams.

Regarding claim 17, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, but fail to disclose detecting a request by a subscriber for increased bandwidth and increasing the allocated unshared bandwidth to the subscriber destination in accordance with the increased bandwidth request.

In an analogous art, Williams teaches detecting a request by a subscriber for increased bandwidth and increasing the allocated unshared bandwidth to the subscriber destination in accordance with the increased bandwidth request (col. 11, lines 33-42), providing the user with more bandwidth to facilitate large data transfers.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method of McNamara, Binns, Darcie, and Hoarty to include detecting a request by a subscriber for increased bandwidth and increasing the allocated unshared bandwidth to the subscriber destination in accordance with the increased bandwidth request, as taught by Williams, for the benefit of facilitating large data transfers the user wishes to initiate more quickly through the allocation of additional bandwidth to the subscriber destination of the user.

Regarding claim 18, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 1, but fail to disclose detecting a request by a subscriber destination for a service that would require a greater amount of bandwidth than currently allocated to the requesting subscriber destination and increasing the allocated unshared bandwidth to the requesting subscriber destination to handle the requested service.

In an analogous art, Williams teaches detecting a request by a subscriber destination for a service (user inputs request into IID 101 for video on demand service, col. 8, lines 7-11,19-24), wherein if the service requested exceeds the

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traffic capacity of the assigned channel, the allocated unshared bandwidth is increased to handle the requested service (col. 17, lines 2-15), more effectively utilizing bandwidth overall through dynamic allocation of bandwidth on an on demand basis (col. 5, lines 35-40)

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to include detecting a request by a subscriber destination for a service that would require a greater amount of bandwidth than currently allocated to the requesting subscriber destination and increasing the allocated unshared bandwidth to the requesting subscriber destination to handle the requested service, as taught by Williams, for the benefit of more effectively utilizing bandwidth of the communication network through dynamic allocation of bandwidth to subscriber destinations on an on demand basis.

28. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, and Hoarty as applied to claim 1 above, and in further view of Perlman (5,420,862, of record).

Regarding claim 20, McNamara, Binns, Darcie, and Hoarty disclose the method of claim 19, but fail to disclose forwarding a broadcast address resolution protocol request in an attempt to locate a device having the requested physical address if the requested physical address is not found.

In an analogous art, Perlman teaches using Address Resolution Protocol (ARP) messages to 'learn' the physical address of a desired receiving station (col. 4, lines 41-60) in the event that the physical address is not known, but desired, maintaining point to point functionality in the event the database is incomplete, maintaining the desired point-to-point connections.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, and Hoarty to forward a broadcast address resolution request in an attempt to locate a desired device's physical address, as taught by Perlman, for the benefit of preserving the point-to-point integrity of the method.

29. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Darcie, Hoarty, and Perlman as applied to claim 20 above, and further in view of Denker (5,958,053, of record).

Regarding claim 21, McNamara, Binns, Darcie, Hoarty, and Perlman disclose the method of claim 20, but fail to disclose detecting and halting abuse of address requests by a subscriber device.

In an analogous art, Denker teaches tracking the activity of clients from a server, wherein excessive connection attempts result in blocking a client from further attempts to prevent abuse of the system (col. 11, lines 25-50), for the benefit of maintaining the integrity of the server.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Darcie, Hoarty, and Perlman to include detecting and halting abuse by subscriber devices, as taught by Denker, for the benefit of maintaining the integrity of the information distribution method.

30. Claims 22, 25, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Paik, and Gerszberg et al. (6,510,152, of record) [Gerszberg].

Regarding claim 22, McNamara discloses a method of distributing information (col. 3 line 64 – col. 4 line 21) by a point of distribution (fig. 3, headend 10) to subscribers (fig. 3, subscriber nodes) via a communication network (fig. 3, network 28), comprising:

Dividing a television broadcast spectrum into a plurality of subscriber channels (col. 5, lines 21-26), each subscriber channel having a deterministic bandwidth (each channel is set to be capable of a 128 Kb/s transmission rate);

Assigning each of the subscriber destinations to a subscriber channel (col. 5, lines 32-39);

Allocating unshared bandwidth to each of a plurality of subscriber destinations (col. 5, lines 32-39);

Forwarding, by the point of distribution, source information to each subscriber destination based on assigned subscriber channels (source nodes

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send information to user nodes through the head end, col. 4 line 60 – col. 5 line 20, using the assigned channels, col. 7 line 62 – col. 8 line 24);

Modulating, by the point of distribution, source information for each subscriber channel (FSK modulator 16 in headend 10, col. 4, lines 30-54);

Combining, by the point of distribution, modulated information from each subscriber channel into a combined signal (there are at least 80 disclosed FSK data channels in the forward and return spectrum space handled by the headend, col. 5, lines 21-31, thus it is a combined signal of at least 80 channels which is broadcast from the headend); and

Distributing the combined signal to the plurality of subscriber destinations via the communication network (col. 4, lines 9-21).

McNamara fails to disclose:

- up converting modulated source information into a corresponding one of the subscriber channels
- the communication network is a hybrid fiber coax (HFC) delivery plant
- converting, by the point of distribution, the combined signal into an optical signal;
- transmitting, by the point of distribution, the optical signal to an optical transceiver node via an optical plant;
- converting, by the optical transceiver node, the optical signal into a combined electrical signal;

- transmitting, by the optical transceiver node, the combined electrical signal via a coaxial cable to each of the plurality of subscriber destinations;
- extracting, by a gateway device at a subscriber destination, modulated information from an assigned channel of the combined electrical signal;
- demodulating, by the gateway device, source information from the extracted modulated information; and
- forwarding, by the gateway device and as a function of an address embedded in the source information identifying a subscriber device from among a plurality of subscriber devices at the subscriber destination, demodulated source information to an identified subscriber device at the subscriber destination addressed by the address embedded in the source information.

In an analogous art, Binns teaches up converting modulated source information into corresponding subscriber channels (fig. 4, outputs of baseband to IF modulators 332 and 333 provide modulated source information which is then applied to IF to Downstream channel modulators 328 and 329 which up convert the modulated source information into corresponding subscriber channels, col. 17, lines 15-28), transmitting analog source information over a cable network (fig. 3, cable distribution network).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara to include up converting modulated source information into a corresponding one of the subscriber channels, as taught by Binns, for the benefit of increased network flexibility by handling analog signals as well as digital.

McNamara and Binns fail to disclose:

- the communication network is a hybrid fiber coax (HFC) delivery plant
- converting, by the point of distribution, the combined signal into an optical signal;
- transmitting, by the point of distribution, the optical signal to an optical transceiver node via an optical plant;
- converting, by the optical transceiver node, the optical signal into a combined electrical signal;
- transmitting, by the optical transceiver node, the combined electrical signal via a coaxial cable to each of the plurality of subscriber destinations;
- extracting, by a gateway device at a subscriber destination, modulated information from an assigned channel of the combined electrical signal;
- demodulating, by the gateway device, source information from the extracted modulated information; and

- forwarding, by the gateway device and as a function of an address embedded in the source information identifying a subscriber device from among a plurality of subscriber devices at the subscriber destination, demodulated source information to an identified subscriber device at the subscriber destination addressed by the address embedded in the source information.

In an analogous art, Paik teaches an HFC network (fig. 1, col. 3, lines 48-56), wherein a combined electrical signal is converted to an optical signal at the head end and transmitted (combined signal from several sources is converted to an optical signal before transmission by the head end, col. 3, lines 57-67) to an optical receiver node (fig. 1, distribution terminal 12) via an optical plant (fig. 1, optical fiber 16), where it is converted into a combined electrical signal (col. 4, lines 3-13) and transmitted via coaxial cable (fig. 1, cable 18) to each of a plurality of subscriber destinations (col. 4, lines 3-13), wherein HFC networks are a cost efficient form of long distance signal transmission (col. 1 line 66 – col. 2 line 7).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara and Binns to include an HFC delivery plant wherein the point of distribution (head end) converts the combined electrical signal into an optical signal, transmits the optical signal to an optical transceiver node via an optical plant, converting the optical signal into a combined electrical signal at the optical transceiver node, and transmitting the

combined electrical signal via a coaxial cable to each of a plurality of subscriber destinations, as taught by Paik, for the benefit of utilizing a more effective and cost efficient form of long distance signal transmission to subscriber destinations.

Paik additionally discloses receiving a combined signal at a gateway device (fig. 4, subscriber terminal 14, col. 9, lines 3-8) and extracts modulated information from a channel (using directional coupler 94 and programmable FM tuner 96 in fig. 4), wherein source information is demodulated (fig. 4, FM demodulator 98) and forwarded to subscriber devices at the subscriber destination (output 112 from signal processor 100 goes to connected subscriber device, col. 9, lines 40-43), providing the benefit of offering a variety of services simultaneously from a single subscriber destination (col. 9, lines 3-15, 33-43).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, and Paik to include extracting, by a gateway device at a subscriber destination, modulated information from an assigned channel, demodulating, by the gateway device, source information from the extracted modulated information, and forwarding, by the gateway device, demodulated source information to a subscriber device at the subscriber destination, as taught by Paik, for the benefit of offering a variety of services simultaneously over the communication network to customers from a single subscriber destination.

McNamara, Binns, and Paik fail to disclose:

- forwarding, by the gateway device and as a function of an address embedded in the source information identifying a subscriber device from among a plurality of subscriber devices at the subscriber destination, demodulated source information to an identified subscriber device at the subscriber destination addressed by the address embedded in the source information.

In an analogous art, Gerszberg teaches a gateway device (fig. 1E, residential gateway 22) which forwards information based on source information identifying a subscriber device from a plurality of subscriber devices at a subscriber destination (said gateway forwards received data as appropriate, most notably, it forwards data onto an Ethernet network, which requires a device address for proper routing, col. 7, lines 30-53), for the benefit of simultaneously providing several types of disparate, independent services (computer data, telephone, and CATV, col. 5, lines 52-67) from said gateway device.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, and Paik to include forwarding, by the gateway device and as a function of an address embedded in the source information identifying a subscriber device from among a plurality of subscriber devices at the subscriber destination, demodulated source information to an identified subscriber device at the subscriber destination addressed by the address embedded in the source information, as taught by Gerszberg, for the benefit of simultaneously providing several types of disparate, independent

services, such as digital telephone and computer data services, in addition to television services, from said gateway device.

Regarding claim 25, Paik additionally teaches splitting broadcast information from a received combined electrical signal (subscriber terminal 14 receives combined signal and tunes to broadcast information on a given frequency for display, col. 4, lines 13-24), for the benefit of increasing the choices available to subscribers by including broadcast content (col. 3, lines 57-67).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, and Gerszberg to include splitting broadcast information from the combined electrical signal, as taught by Paik, for the benefit of increasing the viewing choices available to subscribers by including broadcast content in the combined electrical signal for extraction and viewing.

Regarding claim 32, McNamara, Binns, Paik, and Gerszberg disclose the method of claim 22, which sends, by a bandwidth manager (network resource manager), a channel switch command to the subscriber destination wherein the subscriber destination switches from an assigned channel to another channel in response to said switch command (McNamara, col. 5, lines 32-39).

McNamara, Binns, Paik, and Gerszberg fail to disclose the bandwidth manager is at the point of distribution and the command is received by a gateway device which also performs the switching.

McNamara teaches the system control nodes (including NRM 36) may be located anywhere (col. 6, lines 25-38), and the most logical place to put a system control resource is physically proximate to the head end, for maintenance and security reasons.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclose by McNamara, Binns, Paik, and Gerszberg to locate the address resolution device at the head end, in order to more closely monitor and maintain all of the hardware which performs the data storage and data routing.

Paik teaches using a gateway (fig. 4, subscriber terminal 14) which controls the distribution of data to several subscriber devices (individual subscriber equipment sets 90 within subscriber terminal 14 provide the interface for supplying data to subscriber devices such as TVs and VCRs, col. 9, lines 3-14, 40-43), simultaneously offering network services to a plurality of devices.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, and Gerszberg to include a gateway, as taught by Paik, which would perform the disclosed switch command (McNamara, col. 5, lines 32-39) by the 'programmable tuner' (tuner 96 in fig. 4 of Paik, as a remote channel switch command is directed toward tuner

control, and the tuner is located in the gateway device), for the benefit of offering a variety of services simultaneously over the communication network to customers from a single subscriber destination.

Regarding claim 33, Paik teaches receiving, by the optical transceiver node (fig. 3, distribution terminal 12), a plurality of upstream subscriber RF signals from the subscriber destinations (col. 8 line 65 – col. 9 line 2), combining by the optical transceiver node, the upstream subscriber RF signal into a combined upstream signal (fig. 1, the distribution terminal collects RF signals from several subscriber terminals over coax 18 from transmission over a single fiber 16), converting, by the optical transceiver node, the combined upstream signal into an optical upstream signal (via laser driver 78 in fig. 3), and transmitting by the optical transceiver node, the optical upstream signal via an optical plant to the point of distribution (optical upstream signal is transmitted through WDM 70 over fiber 16 to head end 10).

31. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Paik, and Gerszberg as applied to claims 22 and 25 above, and further in view of Williams.

Regarding claims 24 and 26, McNamara, Binns, Paik, and Gerszberg disclose the method of claims 22 and 25, but fail to disclose converting, by a

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gateway device, source information into a format appropriate for a subscriber device.

Williams teaches converting, by a gateway device, source information into a format appropriate for a subscriber device (a received video signal is formatted for display on a television set, col. 9, lines 59-64), maximizing the flexibility of the gateway device in delivering services to customers through scalable, modular, compatibility with subscriber devices (service definition modules provide compatibility with a wide variety of devices, col. 7 line 26 – col. 8 line 18).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, and Gerszberg to include converting, by a gateway device, demodulated source information into a format appropriate for the addressed subscriber device, as taught by Williams, for the benefit of maximizing the flexibility of the gateway device in delivering services to customers through scalable, modular, compatibility with the addressed subscriber devices.

32. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Paik, and Gerszberg as applied to claim 22 above, and further in view of Eng.

Regarding claim 27, McNamara, Binns, Paik, and Gerszberg disclose the method of claim 22, but fail to disclose modulating, by a gateway device at a subscriber destination, subscriber information from a subscriber device, up

converting, by the gateway device, the modulated subscriber information to a radio frequency (RF) signal and transmitting, by the gateway device, the subscriber RF signal to the optical transceiver node via the coaxial cable.

Paik additionally discloses modulating, by a gateway device at a subscriber destination (fig. 4, subscriber terminal 14), subscriber information from a subscriber device (service request signal is modulated by FSK modulator, col. 9, lines 50-63), and transmitting (signal is upstream, col. 8 line 65 - col. 9 line 2), by the gateway device, the subscriber RF signal to the optical transceiver node (fig. 1, distribution terminal 12) via the coaxial cable (fig. 1, coaxial cable 18), enabling subscribers to make requests for desired content (col. 3, lines 57-67).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, and Gerszberg to include modulating, by a gateway device at a subscriber destination subscriber information from a subscriber device, and transmitting, by the gateway device, the subscriber RF signal to the optical transceiver node via the coaxial cable, for the benefit of enabling subscribers to make requests for desired content.

In an analogous art, Eng teaches up converting modulated subscriber information (fig. 10A, tuner 178 up converts a modulated signal onto an assigned upstream band, col. 13, lines 1-15), for the benefit of dynamically placing the modulated signal onto desired bands (col. 13, lines 15-19).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method of McNamara, Binns, Paik, and Gerszberg to include up

converting by a gateway device, modulated subscriber information, as taught by Eng, for the benefit of dynamically placing the modulated signal onto desired bands, such as low noise bands.

Regarding claim 28, Paik additionally discloses storing the subscriber information in digital format (the subscriber request comes from RCU 114 and is in digital format because it is stored in microcomputer 102, col. 9, lines 50-54), requiring the information to be converted into digital format if it is not in digital format already, enabling the subscriber information to be processed by the computer systems which control the flow of information throughout the network.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, and Gerszberg to include handling the subscriber information in digital format, as taught by Paik, requiring the information to be converted into digital format if it is not in digital format already, for the benefit of enabling the subscriber information to be processed by the computer systems which control the flow of information throughout the network and because data signals are known to be a very robust form of data signals.

33. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Paik, Gerszberg, and Eng as applied to claim 27 above, and further in view of Perlman.

Regarding claim 29, McNamara, Binns, Paik, Gerszberg, and Eng disclose the method of claim 27, wherein the gateway device receives a physical address request (McNamara discloses requesting the physical addresses of other nodes, as messages sent to the NRM 36 include the symbolic name of the destination node with which the originating device wishes to establish contact, col. 7 line 62 – col. 8 line 6) where it is converted to a unicast packet format (McNamara teaches messages transmitted over the network are all uniquely addressed for reception by a particular node, col. 7, lines 26-33 and are assembled as such before transmission, col. 10, lines 9-11) and forwarded to an address resolution device (McNamara, fig. 3, NRM 36, col. 7 line 62 – col. 8 line 6).

McNamara, Binns, Paik, Gerszberg, and Eng fail to disclose the address resolution device is located at the head end and the physical address request is in broadcast packet format.

McNamara teaches the system control nodes (including NRM 36) may be located anywhere (col. 6, lines 25-38), and the most logical place to put a resource which contains a database of all channel assignments and physical addresses (col. 6, lines 56-65) is physically proximate to the head end, for maintenance and security reasons.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclose by McNamara, Binns, Paik, Gerszberg, and Eng to locate the address resolution device at the head end, in order to more

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closely monitor and maintain all of the hardware which performs the data storage and data routing.

In an analogous art, Perlman teaches the use of Address Request Protocol messages (a broadcast packet format) as a common means by which devices which communicate with TCP/IP type protocols locate each other (col. 4, lines 41-60).

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, Gerszberg, and Eng to include receiving the physical address request in a broadcast packet format, as taught by Perlman, for the benefit of adaptably receiving address requests from devices which communicate using TCP/IP type protocols, such as computers with modems, enhancing the service by increasing the diversity of subscriber devices which it can accommodate for receiving information services.

34. Claims 30 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over McNamara, Binns, Paik, and Gerszberg as applied to claim 22 above, and further in view of Wonfor et al. (6,381,747, of record) [Wonfor].

Regarding claims 30 and 31, McNamara, Binns, Paik, and Gerszberg disclose the method of claim 22, and additionally disclose a bandwidth manager (NTM 32 working with NRM 36, McNamara, col. 6 line 48 – col. 7 line 7), but fail to disclose the gateway tracks and forwards bandwidth usage information for

each of a plurality of service types and that the bandwidth manager is located at the point of distribution.

McNamara teaches the system control nodes (including NRM 36 and NTM 32) may be located anywhere (col. 6, lines 25-38), and the most logical place to put a resource which and handles sensitive information (such as billing information, col. 7, lines 3-5) is physically proximate to the head end, for maintenance and security reasons.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclose by McNamara, Binns, Paik, and Gerszberg to locate the bandwidth manager at the head end, in order to more closely monitor and maintain the hardware which handles and stores sensitive information.

In an analogous art, Wonfor teaches monitoring at a subscriber location the use of all services for which a customer must pay for, and reports the usage of said services back to a control and billing center (col. 5, lines 15-24), for the benefit of proper billing of customers for services rendered.

It would have been obvious at the time to a person of ordinary skill in the art to modify the method disclosed by McNamara, Binns, Paik, and Gerszberg to include tracking and forwarding bandwidth usage information from the subscriber location to the bandwidth manager, as taught by Wonfor, for the benefit of proper billing of customers for specifically those services rendered over the allocated bandwidth.

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35. Claims 34-41, 44, 45, 49, 51, 52, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty in view of Gilbert et al. (6,016,311, of record) [Gilbert] and Hagiwara et al. (4,876,681) [Hagiwara].

Regarding claim 34, Hoarty discloses a communication system for distributing information via a network to a plurality of subscriber destinations (fig. 5), comprising:

a switch matrix (fig. 5, switch 54) that forwards source information (output of MMCs 53 in fig. 5) for each subscriber destination (col. 7, lines 19-29, 54-61) to a corresponding one of a plurality of ports of the switch matrix (information is routed to the line which feeds the appropriate modulator 55, fig. 5) based on address information (interactive services are addressed to the requesting subscriber, as MMCs are allocated on an on demand basis, col. 7, lines 19-29);

A plurality of modulators (fig. 5, modulators 55), each modulator coupled to a port of the switch, and each modulator operable to modulate and up convert information received from a respective switch port to an RF signal (col. 7 lines 58-61) within a respective one of a plurality of subscriber channels ('virtual channels' in fig. 7, as the MMCs which provide services are assigned on an on demand basis, col. 7 line 66 – col. 8 line 4 and routed to subscriber specific virtual channels, col. 8, lines 40-49) of a television broadcast spectrum (fig. 31, 'interactive channels' 317 are the virtual channels described, and lie in the television broadcast spectrum);

Each of the plurality of subscriber channels being assigned to one (channels are allocated per subscriber for various services, col. 8, lines 40-49) or more ('party lines' to MMCs, col. 12, lines 23-28) of the subscriber destinations, each subscriber destination being assigned an unshared bandwidth allocation ('virtual channels' operate at a fixed frequency that is assigned to a particular set top, col. 8, lines 40-49);

A combiner (fig. 5, RF combiner 56), coupled to the modulators, the combines modulated information from each modulator into a combined signal; and

A transmitter (fig. 5, transmitter 57), coupled to the combiner, that transmits the combined signal to the plurality of subscriber destinations via the network.

Hoarty fails to disclose the switch matrix comprises arrays of switches organized as a pyramid configuration including a lowest level first array of switches and one or more higher level arrays of switches, each first array switch coupled to a subset of RF modems, and each switch of each higher level array coupled to a subset of switches of an adjacent lower level array.

In an analogous art, Gilbert teaches using a modular modem bank (fig. 6, modem bank 130) in two-way communication between a point of distribution (fig. 6 illustrates cell site 104, col. 10, lines 60-62, which includes a video server control computer 128 or a video server, col. 10 line 60 – col. 11 line 3) and subscriber destinations (fig. 4, CPE 110, col. 11 lines 8-12), as using a modular

bank of modems for both upstream and downstream communications allows the point of distribution to be optimally configured according to capacity needs (col. 11, lines 13-20).

It would have been obvious at the time to a person of ordinary skill in the art to replace the modulators disclosed by Hoarty with RF modems, as taught by Gilbert, for the benefit of optimally configuring the capacity of upstream/downstream communications of the point of distribution according to the specific needs of the system.

Hoarty and Gilbert fail to disclose the switch matrix comprises arrays of switches organized as a pyramid configuration including a lowest level first array of switches and one or more higher level arrays of switches, each first array switch coupled to the subset of RF modems, and each switch of each higher level array coupled to a subset of switches of an adjacent lower level array.

In an analogous art, Hagiwara teaches using a switch matrix that comprises arrays of switches organized as a pyramid configuration including a lowest level first array of switches higher level arrays of switches, each first array switch coupled to an output, and each switch of each higher level array coupled to a subset of switches of an adjacent lower level array (fig. 1c, col. 6, lines 29-58), for the benefit of any easily expandable switching arrangement (col. 7, lines 15-51).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty and Gilbert to include a switch

matrix that comprises arrays of switches organized as a pyramid configuration including a lowest level first array of switches higher level arrays of switches, each first array switch coupled to an output, and each switch of each higher level array coupled to a subset of switches of an adjacent lower level array, as taught by Hagiwara, for the benefit of any easily and non-limited expandable switching arrangement.

Regarding claim 35, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, additionally disclosing source servers (Hoarty, fig. 5, sources 51), coupled to respective ports of the switch (Hoarty, fig. 5, switch 54), that provide source information (Hoarty, col. 7, lines 11-35).

Regarding claim 36, Hoarty, Gilbert, and Hagiwara disclose the system of claim 35, wherein the source servers include a video server (Hoarty, fig. 6, video server 64 and col. 7, lines 36-47), but fail to disclose the servers include a computer network server and a telephone network server.

Examiner takes official notice that it is notoriously well known in the art to include computer network servers and telephone network servers at the headends of television distribution service providers. Inclusion of such servers allows content providers to broaden the number and types of services available to their customers, as a computer network server would provide Internet access and a telephone network server would provide telephonic communications.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include a computer network server and a telephone network server, for the benefit of broadening the number and types of services available to customers to include computer network data and telephonic communications.

Regarding claim 37, Hoarty, Gilbert, and Hagiwara disclose the system of claim 35, wherein a source server comprises an MPEG converter that receives and provides broadcast video content (Hoarty, col. 11, lines 6-37).

Regarding claim 38, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, wherein the source information comprises data packets and the switch retrieving an address from data packets and forwarding the data packets based on the address (Hoarty, col. 9, lines 46-65, wherein the switch itself performs the processing for addressed forwarding, as taught by Hagiwara, col. 6, lines 29-58).

Regarding claims 39 and 40, Hoarty, Gilbert, and Hagiwara disclose the system of claim 38, wherein each address identifies one of the plurality of subscriber destinations [specifically, a subscriber device] (Hoarty, col. 9, lines 46-65 and Hagiwara, col. 6, lines 52-58).

Regarding claim 41, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, but fail to disclose the switch comprises an Ethernet switch.

Examiner takes official notice that Ethernet switches are notoriously well known in the art, as Ethernet switching systems are a near ubiquitous standard for packet based switching in local network environments, as Ethernet provides robust, high speed, packet routing.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include an Ethernet switch, for the typical benefit of utilizing Ethernet protocol switching, a robust, high speed and widely accepted standard for packet routing.

Regarding claim 44, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, wherein the switch matrix comprises a first array for handling a high level of bandwidth (Hagiwara, fig. 1c, wherein the topmost level handles the highest bandwidth, having to route all data streams passing through the matrix), a second array for handling a medium level of bandwidth (Hagiwara, fig. 1c, wherein the middle tier of switches only route a subset of the streams that pass through the topmost tier), and a third array for handling a low level of bandwidth (Hagiwara, fig. 1c, wherein the bottom level handles individual data streams to a particular customer).

Regarding claim 45, Hoarty, Gilbert, and Hagiwara disclose the system of claim 44, wherein the first, second, and third array are coupled to the source servers (as it is the switch matrix as a whole that routes information from the source servers to customers, Hoarty, fig. 5), said source servers including a video server (Hoarty, fig. 6, video server 64 and col. 7, lines 36-47).

Hoarty, Gilbert, and Hagiwara fail to disclose the source servers include a telephone server and a computer network server.

Examiner takes official notice that it is notoriously well known in the art to include computer network servers and telephone network servers at the headends of television distribution service providers. Inclusion of such servers allows content providers to broaden the number and types of services available to their customers, as a computer network server would provide Internet access and a telephone network server would provide telephonic communications.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include a computer network server and a telephone network server, for the benefit of broadening the number and types of services available to customers to include computer network data and telephonic communications.

Regarding claim 49, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, wherein the network includes an optical plant and the transmitter comprises an optical transmitter that converts a combined electrical signal to an

optical signal and that transmits the optical signal on the optical plant (Hoarty, fig. 5, the combined electrical output from RF combiner 56 is fed to optical transmitter 57 which outputs the combined signal as an optical signal onto optical fiber 58, col. 7, lines 28-35).

Regarding claim 51, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, and additionally disclose a broadcast television source that provides broadcast television in a predetermined frequency range of the television broadcast spectrum (Hoarty, fig. 10, original cable channels 90 provided by cable broadcast channels source 72 in fig. 7), the subscriber channels allocated into a remaining portion of the television broadcast spectrum outside the predetermined frequency range (fig. 10, interactive carriers 92), and the combiner receiving and combining the broadcast television information into the combined signal (Hoarty, as shown in fig. 32, wherein the combiner is located in a regional node, col. 18, lines 36-48).

Regarding claim 52, Hoarty, Gilbert, and Hagiwara disclose the system of claim 51, and additionally disclose a video on demand and modulator server that asserts video information (Hoarty, fig. 6, video on demand server 64) and the combiner receiving and combining the video information into the combined signal (it is one of the available services, so when a video on demand title is ordered, it is combined into the combined signal).

Regarding claim 53, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, and additionally disclose a bandwidth manager (fig. 15, net manager 66a), coupled to the switch, that allocates unshared bandwidth to each subscriber destination (col. 12, lines 5-14).

36. Claims 46, 47, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 34 above, and further in view of Chiang et al. (5,835,725) [Chiang].

Regarding claim 46, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, wherein the switch matrix includes a manager switch coupled to an array switch (Hagiwara, fig. 1c, the topmost switch, which performs the initial switching function) and a bandwidth manager coupled to the manager switch (Hoarty, fig. 15 net manager 66a, col. 12, lines 1-14).

Hoarty, Gilbert, and Hagiwara fail to disclose an address resolution server coupled to the manager switch.

In an analogous art, Chiang teaches using an address resolution server in a data routing system to facilitate the assignment of identifying addresses to connected client systems (col. 8, lines 7-22).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include an

address resolution server, as taught by Chiang, for the benefit of facilitating the assignment of address information to subscriber equipment.

Regarding claim 47, Hoarty, Gilbert, Hagiwara, and Chiang disclose the system of claim 46, wherein the manager switch handles communications between subscriber destinations (all outgoing streams pass through the manager switch [topmost switch shown in Hagiwara, fig. 1c], and thus the manager switch handles all communications between the content sources and all subscriber destinations).

Regarding claim 58, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, but fail to disclose an address resolution server, coupled to the switch, that stores an address database and the address resolution server operative to respond to a physical address request by retrieving and forwarding the physical address based on a logical address.

In an analogous art, Chiang teaches using an address resolution server in a data routing system to facilitate the assignment of identifying addresses to connected client systems (col. 8, lines 7-22), wherein the address resolution server includes an address database (fig. 4, pool of addresses 475) and the address resolution server is operative to respond to a physical address request by retrieving and forwarding the physical address based on a logical address (col. 8, lines 35-56).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include an address resolution server that stores an address database and the address resolution server operative to respond to a physical address request by retrieving and forwarding the physical address based on a logical address, as taught by Chiang, for the benefit of facilitating the assignment of address information to subscriber equipment.

37. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 34 above, and further in view of Goeldner (5,325,090).

Regarding claim 48, Hoarty, Gilbert, and Hagiwara disclose the system of claim 34, but fail to disclose the switch matrix is configured to operate significantly below its maximum bandwidth capacity to provide statistically starved capacity.

In an analogous art, Goeldner teaches adding additional switches to a switching matrix to introduce redundancy into the switching levels, at which point the matrix would be operating significantly below its maximum bandwidth capacity (col. 3, lines 1-17 and col. 1, lines 64-68), providing interruption free operation (col. 1, lines 44-48).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to configure

the switch matrix to operate significantly below its maximum bandwidth capacity to provide statistically starved capacity, as taught by Goeldner, for the benefit of providing interruption free operation by maintaining unused switching nodes that ensure there is always an operable path through the matrix.

38. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 49 above, and further in view of Eng.

Regarding claim 50, Hoarty, Gilbert, and Hagiwara disclose the system of claim 49, and additionally disclose an optical receiver (Hoarty, optical receiver connected to fiber 42c, shown in fig. 7), coupled to the optical plant, that converts an optical upstream signal comprising subscriber information to a subscriber electrical signal (col. 8, lines 10-12);

a splitter, coupled to the optical receiver, that provides the subscriber electrical signal to a plurality of demodulators, each demodulator demodulating subscriber information from a corresponding subscriber RF signal (Hoarty, fig. 15, inbound data is split and applied to a plurality of RF demodulators 155 for receiving inbound, upstream data, col. 11, lines 55-67, said data being subscriber information representing service requests, col. 9, lines 36-45).

Hoarty, Gilbert, and Hagiwara fail to disclose providing the subscriber electrical signal to a plurality of tuners for extracting a corresponding subscriber RF signal and forwarding the subscriber information to the switch.

In an analogous art, Eng teaches providing separate streams of subscriber information (from diplex filter 252 in fig. 14) to a corresponding one of a plurality of tuners (tuners 258 and 259), each tuner tuned to a corresponding subscriber channel and extracting by each tuner a corresponding RF signal (col. 18, lines 45-65, each upstream channel is sent to a separate tuner, and the use of two is illustrative, as the invention contemplates using a plurality of channels which would in turn require a plurality of tuners to extract data from each, col. 11, lines 11-20), enabling flexible, frequency agile reception of upstream information (each tuner is 'frequency agile', col. 18, lines 45-48 and 59-61).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include providing each stream of subscriber information to a corresponding one of a plurality of tuners, each tuner tuned to a corresponding subscriber channel and extracting by each tuner a corresponding RF signal, as taught by Eng, for the benefit of flexible, frequency agile reception of subscriber information.

Hoarty, Gilbert, Hagiwara, and Eng fail to disclose forwarding the subscriber information to the switch.

Examiner takes official notice that it is notoriously well known in the art to allow subscribers of an interactive video distribution system to communicate with each other. Upstream subscriber information sent from one subscriber in such systems is received by the headend or distribution node, and forwarded to the switching apparatus wherein the subscriber information is routed to the

destination subscriber. Such systems allow subscribers to communicate with each other, such as with video conferencing, telephonic communications, or interactive chat programs.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, Hagiwara, and Eng to include forwarding the subscriber information to the switch, allowing subscribers of the system to communicate with each other utilizing such services as video conferencing, telephonic communications, or interactive chat programs.

39. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 53 above, and further in view of Hooper.

Regarding claim 54, Hoarty, Gilbert, and Hagiwara disclose the system of claim 53, but fail to disclose each subscriber channel comprises a plurality of bandwidth increments and the bandwidth manager allocates at least one bandwidth increment to each subscriber destination.

In an analogous art, Hooper teaches establishing fixed point-to-point bandwidths (col. 5, lines 20-23) by subdividing a channel into bandwidth increments (use of frequency division multiplexing to partition a channel into sub-channels, col. 5, lines 20-31), increasing the number of subscribers to which services are provided.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include

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subdividing a subscriber channel into a plurality of bandwidth increments and assigning subscriber destinations at least one bandwidth increment, as taught by Hooper, for the benefit of increasing the number of subscriber destinations to which services can be provided over any given bandwidth portion.

40. Claim 55 rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 53 above, and further in view of Williams.

Regarding claim 55, Hoarty, Gilbert, and Hagiwara disclose the system of claim 53, but fail to disclose detecting a request by a subscriber destination for a service that would require a greater amount of bandwidth than currently allocated to the requesting subscriber destination and increasing the allocated unshared bandwidth to the requesting subscriber destination to handle the requested service.

In an analogous art, Williams teaches detecting a request by a subscriber destination for a service (user inputs request into IID 101 for video on demand service, col. 8, lines 7-11, 19-24), wherein if the service requested exceeds the traffic capacity of the assigned channel, the allocated unshared bandwidth is increased to handle the requested service (col. 17, lines 2-15), more effectively utilizing bandwidth overall through dynamic allocation of bandwidth on an on demand basis (col. 5, lines 35-40)

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include

detecting a request by a subscriber destination for a service that would require a greater amount of bandwidth than currently allocated to the requesting subscriber destination and increasing the allocated unshared bandwidth to the requesting subscriber destination to handle the requested service, as taught by Williams, for the benefit of more effectively utilizing bandwidth of the communication network through dynamic allocation of bandwidth to subscriber destinations on an on demand basis.

41. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 53 above, and further in view of Schwartzman et al. (6,385,773) [Schwartzman].

Regarding claim 56, Hoarty, Gilbert, and Hagiwara disclose the system of claim 53, but fail to disclose the bandwidth manager sends a channel switch command to a subscriber destination to dynamically switch that subscriber destination to another assigned channel.

In an analogous art, Schwartzman teaches sending channel switch commands to subscriber destinations to dynamically switch subscriber destinations to different channels (col. 10 line 53 – col. 11 line 6), for the benefit of utilizing only channels with acceptably low noise (col. 7 line 52 – col. 8 line 2).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include sending a channel switch command to a subscriber destination to dynamically

switch that subscriber destination to another assigned channel, as taught by Schwartzman, for the benefit of utilizing only channels with acceptably low noise to maintain a standard level of quality of service.

42. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Hagiwara as applied to claim 53 above, and further in view of Bigham.

Regarding claim 57, Hoarty, Gilbert, and Bigham disclose the system of claim 53, but fail to disclose the bandwidth manager monitors the bandwidth usage of each of the subscriber destinations.

In an analogous art, Bigham teaches monitoring the bandwidth usage of subscriber destinations for services (the gateway monitors actual bandwidth usage as the link is active, col. 15, lines 60-63), for the benefit of accurate billing of subscribers for services rendered.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Hagiwara to include monitoring bandwidth usage of the subscriber destinations, as taught by Bigham, for the benefit of accurate billing of subscribers for information services rendered to subscriber destinations.

43. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty in view of Gilbert and Huber (4,831,616).

Regarding claim 63, Hoarty discloses a communication system for enabling communication between a point of distribution and a plurality of subscriber destinations via a hybrid fiber coax network (fig. 7), comprising:

An optical plant (fig. 7, optical section of distribution plant 68b);

A point of distribution (fig. 7, head end 11), comprising;

A multi-port switch (fig. 5, switch 54) that forwards source information (output of MMCs 53 in fig. 5) for each subscriber destination (col. 7, lines 19-29, 54-61) to a corresponding port of the switch (information is routed to the line which feeds the appropriate modulator 55, fig. 5) based on address information (interactive services are addressed to the requesting subscriber, as MMCs are allocated on an on demand basis, col. 7, lines 19-29);

A plurality of modulators (fig. 5, modulators 55), each modulator coupled to a port of the switch, and each modulator operable to modulate and convert information received from a respective switch port to an RF signal (col. 7 lines 58-61) within a respective one of a plurality of subscriber channels ('virtual channels' in fig. 7, as the MMCs which provide services are assigned on an on demand basis, col. 7 line 66 – col. 8 line 4 and routed to subscriber specific virtual channels, col. 8, lines 40-49) of a television broadcast spectrum (fig. 31, 'interactive channels' 317 are the virtual channels described, and lie in the television broadcast spectrum);

Each of the plurality of subscriber channels having a deterministic bandwidth (the bandwidth is allocated dynamically and on demand, col. 12, lines

5-14) and assigned to one (channels are allocated per subscriber for various services, col. 8, lines 40-49) or more ('party lines' to MMCs, col. 12, lines 23-28) of the subscriber destinations, each subscriber destination being assigned an unshared bandwidth allocation ('virtual channels' operate at a fixed frequency that is assigned to a particular set top, col. 8, lines 40-49);

A combiner (fig. 5, RF combiner 56), coupled to the modulators, the combines modulated information from each modulator into a combined signal; and

A transmitter (fig. 5, transmitter 57), coupled to the combiner and the optical plant, that converts the combined signal to an optical signal (col. 7, lines 29-32) and that transmits the optical signal via the optical plant (fig. 5, fiber 58);

A coaxial cable (fig. 7, coax drops, 75a, 75b, 75c) distributed to a plurality of subscriber destinations (fig. 7, 76a, 76b, 76c); and

An optical transceiver node (fig. 7, transceivers 43a, 43b), coupled to the optical plant and the coaxial cable, that converts the optical signal to an electrical signal and that transmits the electrical signal to subscriber destinations via the coaxial cable (in an HFC network, signals are initially optical, converted to electrical, then routed to subscribers, col. 6, lines 25-61).

Hoarty fails to disclose using RF modems and forwarding source information based on address information contained in the source information.

In an analogous art, Gilbert teaches using a modular modem bank (fig. 6, modem bank 130) in two-way communication between a point of distribution (fig.

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6 illustrates cell site 104, col. 10, lines 60-62, which includes a video server control computer 128 or a video server, col. 10 line 60 – col. 11 line 3) and subscriber destinations (fig. 4, CPE 110, col. 11 lines 8-12), as using a modular bank of modems for both upstream and downstream communications allows the point of distribution to be optimally configured according to capacity needs (col. 11, lines 13-20).

It would have been obvious at the time to a person of ordinary skill in the art to replace the modulators disclosed by Hoarty with RF modems, as taught by Gilbert, for the benefit of optimally configuring the capacity of upstream/downstream communications of the point of distribution according to the specific needs of the system.

Hoarty and Gilbert fail to disclose forwarding source information based on address information contained in the source information.

In an analogous art, Huber teaches using digital switching to forward video signals to users, wherein the digital switching relies on address information within the source information to properly forward the data (col. 7, lines 39-57), as digital switching systems are simpler in hardware and cabling than conventional analog switching systems (col. 4, lines 38-41).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty and Gilbert to include using digital switching to forward video signals to users, wherein the digital switching relies on address information within the source information to properly forward the data as

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taught by Huber, as digital switching systems are simpler in hardware and cabling than conventional analog switching systems.

44. Claims 64-70 and 74-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, and Huber as applied to claim 63 above, and further in view of Williams.

Regarding claim 64, Hoarty, Gilbert, and Huber disclose the system of claim 63, but fail to disclose a plurality of gateway devices, each located at a respective subscriber destination and coupled to the coaxial cable, each comprising a tuner, for coupling to the coaxial cable, that is tuned to an assigned subscriber channel to extract modulated information from the electrical signal, and a demodulator, coupled to the tuner, that demodulates the extracted modulated information into source information.

In an analogous art, Williams teaches a gateway device at each subscriber premises (fig. 1, IID 101) coupled to a network, which selectively tune to and demodulate incoming signals (col. 12, lines 16-20) on assigned channels (assignment is performed by MAC 105, col. 8, lines 24-31), wherein a gateway device enables the benefit of offering a variety of services simultaneously over the communication network to customers from a single subscriber destination.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Huber to include a gateway device coupled to the network at each subscriber location comprising a

tuner and demodulator for extracting source information from the network, as taught by Williams, for the benefit of offering a wide variety of services simultaneously from the gateway to subscriber devices at the subscriber destination.

Regarding claims 65 and 66, Hoarty, Gilbert, Huber, and Williams disclose the system of claim 64, wherein the tuner is dynamically programmable to tune to multiple subscriber channels (Hoarty discloses the bandwidth allocated to subscriber locations is dynamically assigned 'on demand', col. 12, lines 7-14, requiring the subscriber locations by selectively tunable to the channels they are assigned when services are requested).

Regarding claim 67, Hoarty, Gilbert, Huber, and Williams disclose the system of claim 64, and further disclose the gateway device includes a gateway switch, coupled to the demodulator, that forwards source information to an addressed one of a plurality of subscriber devices. The gateway disclosed by Williams includes a 'level 3' layer of functionality which performs the switching of data to their appropriate destinations (col. 9, lines 1-14) after the 'level 1' layer of data extraction from the received signal takes place (col. 8, lines 51-67), thus a switch for performing the 'level 3' layer function is coupled to the demodulator which is a part of the preceding 'level 1' function, and the switch forwards the source information to the proper device. Each device is inherently addressed,

because there are a plurality of them, and the gateway would require addressing each device in order to discriminate between them when routing the signals of so many disparate services (col. 9, lines 5-14) to subscriber devices that are connected to the gateway in a modular and interchangeable fashion (col. 7, lines 34-40).

Regarding claim 68, Hoarty, Gilbert, Huber, and Williams disclose the system of claim 67, and further disclose the gateway device comprises a plurality of converters (service definition modules 103, Williams, col. 7, lines 34-40), each coupled to the gateway switch, that convert source information to an appropriate format for a corresponding subscriber device (Williams, col. 7, lines 55-64).

Regarding claim 69, Hoarty, Gilbert, Huber, and Williams disclose the system of claim 68, but fail to disclose a set top box coupled to the gateway device and the gateway device including a video converter that converts source information into video data that is forwarded to the set top box.

However, Williams teaches the service definition modules of the gateway device generally provide network interfacing to any number of different devices over different mediums (including RF coaxial cable, col. 8, lines 7-18). Connecting a set top box to a service definition module which provides video data from the source information over an RF coaxial connection would be an obvious embodiment when utilizing the openly flexible gateway disclosed.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system of Hoarty, Gilbert, Huber, and Williams to couple a set top box to the gateway device which would include a video converter that converts source information into video data that is forwarded to the set top box, for the benefit of further utilizing the flexibility offered by the gateway device.

Regarding claim 70, Williams additionally teaches a telephone coupled to the gateway device wherein the gateway device includes an audio converter that converts digital audio data from the source information into telephone analog signals that are provided to the telephone (ISDN terminal adapter 1001 performs D/A and A/D conversion, col. 17, lines 16-32). This is a further example of the flexibility of the gateway device in providing services (col. 7, lines 44-45).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, Huber, and Williams to include a telephone coupled to the gateway device wherein the gateway device includes an audio converter that converts digital audio data from the source information into telephone analog signals that are provided to the telephone, as taught by Williams, for the benefit of further enhanced flexibility of the gateway device through provisioning conventional services as well.

Regarding claims 74 and 75, Williams additionally discloses a splitter ('layer 1' functionality includes a splitter, as the extraction of data includes

demultiplexing, col. 8, lines 60-67), for coupling to the network, that splits broadcast content from the received signal (broadcast services are one of the services eventually forwarded to service definition modules, col. 8, lines 7-11) and a video converter (MPEG decoder) coupled to the splitter, the converts digital information into analog format (col. 9, lines 59-64). This is a further example of the flexibility of the gateway device in providing services (col. 7, lines 44-45).

It would have been obvious at the time to a person of ordinary skill in the art to include a splitter and video converter, as taught by Williams, for the benefit of further enhanced flexibility of the gateway device through provisioning conventional broadcast services as well.

Regarding claim 76, Williams additionally discloses the gateway devices include a modulator that modulates subscriber information from a subscriber device (MAC 102 which is located at the subscriber location, performs modulation, col. 12, lines 16-24, of subscriber information [upstream signals], col. 8, lines 19-24) and an up converter for sending the signal (over the 'narrowband signaling channel').

It would have been obvious at the time to a person of ordinary skill in the art to modify the system of Hoarty, Gilbert, Huber, and Williams to include in the gateway devices a modulator and up converter, as taught by Williams, for the

benefit of enabling upstream communications from the subscriber destinations for making selections and requests for interactive services.

Regarding claim 77, Williams additionally teaches the gateway devices include a converter (ISDN terminal adapter 1001 in fig. 10) that converts the subscriber information into digital format (col. 17, lines 23-32), for the benefit of utilizing a digital protocol for data communications from analog devices, wherein digital signals are known to be more robust and less prone to error.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, Huber, and Williams, to include a converter, as taught by Williams, for the benefit of utilizing a digital protocol for data communications from analog devices at the subscriber destination, wherein digital signals are known to be more robust and less prone to error.

Regarding claim 78, Hoarty, Gilbert, Huber, and Williams disclose the system of claim 76, and additionally disclose an optical transceiver node including an optical converter that converts a plurality of upstream RF signals from the coaxial cable into an upstream optical signal and that transmits the upstream optical signal to the point of distribution via the optical plant (fig. 4, optical transmitter 43c receives combined upstream RF from combiner 47 for transmission to point of distribution 11).

45. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Gilbert.

Regarding claim 62, Williams discloses the system of claim 59, and discloses the optical plant includes an upstream optical plant (col.8, lines 19-24) and the point of distribution includes a WDM splitter (fig. 4, splitter 404) coupled to the WDM selector via the upstream optical plant (they are coupled through common connection to fiber 104, shown in fig. 4).

Williams fails to disclose the WDM splitter is coupled to each of the plurality of optical transceivers via a separate fiber optic cable.

In an analogous art, Gilbert teaches a point of deployment fig. 6, cell site 104, col. 10 line 60 – col. 1 line 5) which handles upstream/downstream communications with subscribers in a modular fashion (upstream/downstream connections with subscribers is handled by a modular modem bank, col. 11, lines 6-12), for the benefit of upgradeability and optimization of the point of deployment's capacity for communications (col. 11, lines 13-20).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Williams to implement upstream/downstream communications with subscribers in a modular fashion, as taught by Gilbert, wherein each discrete wavelength channel of upstream/downstream communication would be routed through discrete transceivers, thus the WDM splitter which receives the upstream signals would

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be coupled to each of the plurality of optical transceivers via a separate fiber optic cable, for the benefit of upgradeability, through the addition of more transceivers, and optimization, by matching the number of transceivers to the load requirements of subscribers, of the point of deployment's capacity for distributing information.

46. Claim 71 and 72 rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, Huber, and Williams as applied to claim 67 above, and further in view of Wonfor.

Regarding claims 71 and 72, Hoarty, Gilbert, Huber, and Williams disclose the system of claim 67, but fail to disclose management and control logic that that monitors bandwidth usage for each of one of more service types and reports service type bandwidth usage to the point of distribution.

In an analogous art, Wonfor teaches monitoring at a subscriber location the use of all services for which a customer must pay for, and reports the usage of said services back to a control and billing center (col. 5, lines 15-24), for the benefit of proper billing of customers for services rendered.

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, and Williams, to include tracking and forwarding bandwidth usage information from the subscriber location to the point of distribution, as taught by Wonfor, for the benefit of proper

billing of customers for specifically those services rendered over the allocated bandwidth.

47. Claim 73 rejected under 35 U.S.C. 103(a) as being unpatentable over Hoarty, Gilbert, Huber, Williams, and Wonfor, as applied to claim 71 above, and further in view of McNamara and Perlman.

Regarding claim 73, Hoarty, Gilbert, Huber, Williams, and Wonfor disclose the system of claim 71, but fail to disclose the management and control logic receives a physical address request in broadcast format from a local subscriber device and converts the request to unicast format, and forwards the unicast physical address request to the point of distribution.

In an analogous art, McNamara teaches receiving physical address requests and forming unicast format physical address request packets out of them (fig. 10, requests created in packet format are addressed to go to a specific destination, NRM 36, col. 12, lines 24-32), which are sent to the point of distribution (NRM 36 may be located any where in the network, col. 6, lines 25-38, placing it at the point of distribution would be optimal for security maintenance of the node).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, Huber, Williams, and Wonfor to include receiving a physical address request and converting the request to unicast format, and then forwarding the unicast physical address

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request to the point of distribution, as taught by McNamara, for the benefit of learning the physical address of a device directly from a resource which knows exactly what the desired physical address is.

In an analogous art, Perlman teaches the use of Address Request Protocol messages (a broadcast packet format) as a common means by which devices which communicate with TCP/IP type protocols locate each other (col. 4, lines 41-60).

It would have been obvious at the time to a person of ordinary skill in the art to modify the system disclosed by Hoarty, Gilbert, Huber, Williams, Wonfor, and McNamara to include receiving the physical address request in a broadcast packet format, as taught by Perlman, for the benefit of adaptably receiving address requests from devices which communicate using TCP/IP type protocols, such as computers with modems, enhancing the service by increasing the diversity of subscriber devices which it can accommodate for receiving information services.

48. The following are suggested formats for either a Certificate of Mailing or Certificate of Transmission under 37 CFR 1.8(a). The certification may be included with all correspondence concerning this application or proceeding to establish a date of mailing or transmission under 37 CFR 1.8(a). Proper use of this procedure will result in such communication being considered as timely if the established date is within the required period for reply. The Certificate should be signed by the individual actually depositing or transmitting the correspondence or by an individual who, upon information and belief, expects the correspondence to be mailed or transmitted in the normal course of business by another no later than the date indicated.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dominic D. Saltarelli whose telephone number is (571) 272-7302. The examiner can normally be reached on Monday - Friday 7:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Grant can be reached on (571) 272-7294. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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